Occurrence and Distribution of *Polygonum* Species in Ohio[1]

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ABSTRACT. **Study of herbarium specimens from 23 Ohio institutions revealed that there are 24 species of *Polygonum* in the state—sixteen native and eight alien. These species fall into six sections, all of which have been treated as genera by various authors in the past. They are treated here as part of *Polygonum sensu lato*. Some of the species have been documented in only two or three counties, while others are widely distributed in all 88 counties. At least one native species, *P. careyi*, is presumed extirpated from the state. A purpose of this paper is to develop a key to the identification of the species. Another purpose is to show their distribution in the state by county maps.**

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INTRODUCTION

The genus *Polygonum* is large and heterogeneous, and recent estimates put the number of species at about 150 (Graham and Wood 1965, Bailey Hortorium Staff 1976). The known Ohio flora contains 24 species, though a few of them may no longer be present. Eight species are alien and 16 are native. In the list below, names of naturalized or adventive species are preceded by an asterisk. Eighteen of the 24 are listed in the Weed Science Society of America's *Composite List of Weeds* (1989). The common name of each, as given in this work, is included in the species list.

The 24 species fall into six sections, based almost entirely on vegetative characters. The section names employed in this paper follow the scheme used by Gleason and Cronquist (1991). These sections have all been raised to generic rank by various authors at different times in the past; but here they are all treated as part of *Polygonum*, in the broad sense.

MATERIALS AND METHODS

Forty-seven hundred herbarium specimens on deposit in 23 Ohio institutions were examined and identified in order to develop a key to identification and distribution maps to the *Polgonums* in Ohio. These institutions include: The Ohio State University, Kent State University, Oberlin College, Ohio University, Bowling Green State University, Miami University, Cleveland Museum of Natural History, University of Cincinnati, Denison University, Youngstown State University, Muskingum College, College of Wooster, University of Akron, Baldwin-Wallace College, Dayton Museum of Natural History, Heidelberg College, Wittenberg University, Wilmington College, Urbana University, Antioch College, The (Stark) Wilderness Center, Ohio Wesleyan University, and Hiram College.

RESULTS AND DISCUSSION

Description of *Polygonum*

The plants are herbaceous, annual or perennial, inhabiting dry, mesic, moist or wet places, some of them aquatic, and mostly regarded as weeds, or at least weedy. Leaves are simple, alternate, and entire, with stipules forming a sheath, the ocrea, around the stem distal to the node, which is often swollen. Flowers are small, actinomorphic, apetalous, and hypogynous. Sepals are mostly four or five, often petaloid (green, white, pink, red, or purple); stamens usually five to eight, carpels two or three but with only a single one-celled ovary developing, styles two or three, stigmas usually capitate. Fruit is a lenticular or trigonous achene, partly or completely enclosed by the persistent calyx; pericarp is smooth and lustrous to rough and dull, and colored light brown, dark brown, or black.

Analytical Key to Ohio Species of *Polygonum*

a. Flowers axillary: solitary or in small clusters; ocreae hyaline, becoming lacerate; leaf blade jointed at the base. (True knotweeds). . . b
  b. Leaves plicate with 2 longitudinal folds. Uncommon. *P. tenue*
  b. Leaves flat or revolute. . . c
    c. Pedicels exserted beyond ocreae. . . d
      d. Leaves long and slender, nearly linear. Uncommon. *P. ramosissimum*
      d. Leaves oval or oblong, rounded at tip. *P. erectum*
    c. Pedicels mostly included within ocreae. . . e
      e. Leaves linear to elliptic or oblong. Common. *P. aviculare*
      e. Leaves elliptic to obovate, rounded at tip. Rare. *P. achoreum*

a. Flowers in terminal or axillary spikelike heads or racemes, or in panicles; ocreae herbaceous and integral; leaf blades not jointed at junction to petiole. . . f
  f. Stems unable to stand alone—either weak and reclining, or twining; plants terrestrial. . . g
    g. Stems weak and reclining, armed with recurved prickles; often in wet ditches. (Tearthumbs). . . h
      h. Leaves strongly hastate. *P. arifolium*
      h. Leaves clearly sagittate. *P. sagittatum*
    g. Stems twining on fences or other vegetation,unarmed; habitat damp but not wet. . . i
      i. Ocreae with ring of reflexed stiff hairs at base; flowers in open panicles. Uncommon. *P. cilinode*
      i. Ocreae beardless at base; flowers in racemose inflorescences. . . j

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j. Sepals dull and roughened with tiny granules; sepals not winged, or if so, wings small; achenes dull, black. *P. convolvulus*
j. Sepals smooth with no granules present; at least some sepals prominently winged; achenes lustrous, black. *P. scandens*

f. Stems erect, or plants aquatic. . . k
k. Outer sepals winged; tall robust herbaceous perennials. . . l
l. Leaf blades truncate at base, abruptly cuspidate at tip. *P. cuspidatum*
1. Leaf blades cordate at base, gradually tapering to tip. *P. sachalinense*
k. Outer sepals without wings. . . m
m. Styles elongated and conspicuous, persistent in fruit, becoming hard, deflexed, and hooked at tip; woodland wildflower. *P. virginianum*
m. Styles short, not conspicuous; plants of sunny and/or disturbed terrestrial places, or plants aquatic. (Smartweeds). . . n
n. Racemes rarely more than 1 or 2, terminal; aquatic or mud plants, or of drier places. *P. amphibium*
n. Racemes several to many, terminal and lateral; plants of usually damp, sometimes wet, places. . . o
o. Summit of ocreae flanged. Uncommon. *P. orientale*
o. Summit of ocreae entire or ciliate, but not flanged. . . p

p. Summit of ocreae entire, not ciliate. . . q
q. Veins in outer sepals forked at apex, branches recurved; racemes drooping; peduncles glabrous or with a few glands or hairs. *P. lapathifolium*
q. Veins in sepals not forked at apex; racemes erect; peduncles beset with stalked glands or with hairs, or rarely glabrous. *P. pensylvanicum*

p. Summit of ocreae definitely ciliate. . . r
r. Plants very pubescent or glandular; racemes drooping. Rare. *P. careyi*
r. Plants more or less glabrous. . . s
s. Calyx gland-dotted throughout, the glands appearing as tiny resin droplets. . . t
t. Foliage leaves not bearing axillary flowers, their ocreae thus cylindrical; achenes lustrous. . . u
u. Plants annual with slender stems; leaves rarely more than 2 cm wide. *P. punctatum*
u. Plants perennial with stout stems; leaves 2-3 cm wide. Rare. *P. robustius*
t. Foliage leaves bearing cleistogamous flowers within their ocreae, their ocreae thus appearing gibbous; achene dull. *P. hydropiper*
s. Calyx not gland dotted. . . v
v. Cilia of ocreae prominent and 5-10 mm long; leaves often subrhombic, sometimes lanceolate; perianth rose-purple. *P. cespitosum*
v. Cilia of ocreae usually less than 5 mm long; leaves lanceolate; perianth rose, pink, or white. . . w
w. Pedicels short, mostly included in ocreolae; racemes dense, the flowers crowded together; annual plants of mesic habitats. *P. persicaria*
w. Pedicels long, exserted beyond ocreolae; racemes lax, often interrupted; perennial plants of wet habitats, rooted at lower nodes. *P. hydropiperoides*

Species List (Fig. 1)

Section *Avicularia* (Knotweeds)

The plants in this section are characterized by their small leaves, and by their adaptation to moderate-to-dry habitats. There are five species in Ohio.

*1. *Polgonum aviculare* L. Prostrate knotweed. These plants are complex, polymorphic, cosmopolitan weeds. Many varieties and forms have been segregated in the past, some of them even elevated to specific rank. For example, Mitchell and Dean (1978) following Styles (1962) consider the prostrate knotweeds of New York to be of two species, *P. aviculare* and *P. arenastrum* Boreau. Another binomial often encountered is *P. buxiforme* Small. Voss (1985), however, considers the prostrate knotweeds of Michigan to be of only the one species, *P. aviculare, sensu lato.* In this paper, we follow Voss in considering these plants to be of one conglomerate species. Perhaps in the future, after careful study, this taxon can be divided with confidence.

If any plant could be regarded as a ubiquitous weed, prostrate knotweed surely qualifies. Its low stature enables it to survive mowing, and so it is common in lawns and pastures, particularly in areas as along paths where there is heavy traffic. It endures trampling better than true grasses, and so the grasses may be killed allowing the knotweed to flourish. Roadsides and cracks in sidewalks are also favorite habitats. In addition, it grows well in calcareous and saline areas. There is no doubt that it is present in every Ohio county, though it has not been collected from all.

Other vernacular names which have been applied to this polygonum are door-weed and yard-grass, because of its prevalence in door yards.

2. *Polgonum erectum* L. Erect knotweed. This species, occurring mostly in eastern and southern counties, is much less common than *P. aviculare.* The leaves are larger and broader, and tend to be heterophyllous. Another useful diagnostic character is the exsertion of pedicels beyond ocreae as compared with *P. aviculare.* More erect growth habit makes this species intolerant of mowing, and hence it is generally absent from lawns.

3. *Polygonum achoreum* Blake. Striate knotweed. This northern species has been collected from only two counties in northern Ohio. It has not been reported in Pennsylvania (Wherry et al. 1978) or in Indiana (Deam 1940), but has been reported from several counties in New York (Mitchell and Dean 1978) and in Michigan (Voss 1985).

4. *Polygonum ramosissimum* Michx. Bushy knotweed.

This species has been collected from only three widely separated counties in Ohio. It is more common northward and westward, and also along the Atlantic Coast. The pedicels are exserted beyond the ocreae as in *P. erectum* but the leaves are very slender. The species is quite variable, and no attempt was made to place the four Ohio specimens in any infraspecific taxon.

5. *Polygonum tenue* Michx. Slender knotweed. This species can be easily distinguished from other members of the section *Avicularia* on a vegetative basis: the narrow leaves are plicate, with two longitudinal folds parallel to the midrib. This knotweed grows in dry exposed situations with little other vegetation. It is not widely distributed nor common in Ohio.

Section *Persicaria* (Smartweeds)

The leaves of these plants are predominantly lanceolate and often long-acuminate, but sometimes ovate-lanceolate. The leaf sap is often sharp to the taste (sour or peppery), giving rise to the common name *smart*weed since juice causes cuts or injuries to smart. The plants inhabit mesic, wet, or sometimes aquatic places.

This is the largest section of *Polgonum* in Ohio in terms of number of species, containing 11 of the total of 24. Three species, however, are rarely or almost never encountered in the present-day flora. The remaining eight species are listed by the Weed Science Society of America in its *Composite List of Weeds* (1989).

*6. *Polgonum persicaria* L. Ladys-thumb. Heartsease. Pink-weed. The name "ladys-thumb" refers to the purplish spot usually found in the center of the leaves. This spot is rounded or irregular, not chevron-shaped as shown in Mitchell and Dean (1978). The chevron shape is typical of *P. pensylvanicum* L. The name "heartsease" refers to an earlier medicinal use of the plant. The name "pink-weed" refers to the usual flower color, although occasionally the flowers are white.

This species gave the section its name; the word may refer to the resemblance of the leaves to those of the peach, *Prunus persica* Batsch. The achenes are dimorphic: some are lenticular and some trigonous. This ubiquitous weed of damp places was naturalized from Europe. Mitchell and Dean (1978) observe that this is perhaps our most common smartweed.

P. persicaria is often confused with *P. hydropiperoides* Michx., especially in herbarium specimens. The former is annual, not usually living in water, has short thick, dense inflorescences, and the ocreae are membranous with short weak bristles at the summit; whereas the latter is perennial, often found in standing water, has long slender inflorescences often interrupted below, and the ocreae are stout, beset with long hairs, and topped with long heavy bristles at the summit.

7. *Polgonum pensylvanicum* L. Pennsylvania smartweed. This species is an erect, robust, weedy annual of damp, sunny, disturbed places. The achenes are black, flat, and roundish, and are perhaps the largest of any of these 24 *Polgonum* species. They constitute an important food for wildlife. The species is characterized by the absence of cilia on the summit of the ocrea, and by the presence of glandular stipitate hairs on the penduncles. Seedlings usually exhibit a purple mark in the center of the leaves in the form of a chevron. This mark tends to fade out as the plant matures, and may disappear entirely.

Ohio plants are mostly of the variety *laevigatum* Fernald. Myers (1942) has described a variety *eglandulosum* Myers characterized by a reduced number or absence of the glandular hairs described in the preceding paragraph. This population occurs mostly along Lake Erie in Lorain, Erie, and Ottawa counties, including the Erie Islands. We have studied specimens from these counties intensely and have observed that there is among them a gradation or continuum between those which are densely glandular and those with no glands at all. Hence we are unable to draw a clear line separating the two populations, and therefore cannot recognize a variety *eglandulosum*.

8. *Polgonum lapathifolium* L. Pale smartweed. The epithet *lapathifolium* means "dock-leaved," an allusion to the resemblance of the often large-size leaves to those of some species of *Rumex*. The term "pale" refers to the usually white color of inflorescences as opposed to the red or pink color of those of *P. persicaria* and *P. pensylvanicum*. Another feature which distinguishes the inflorescences of *P. lapathifolium* is that they are usually longer, more slender, more limber, and hence drooping or nodding.

A morphological detail which is distinctive and unique for this species is the vein pattern on the sepals. The veins are split in two at the apex, with recurved branches. Some have described these veins as being anchor-shaped.

This is a widespread weed of disturbed soils and moist places, circumboreal in occurrence. It is perhaps the tallest of our common smartweeds, sometimes reaching two meters. Achenes are lustrous, round, flattened, with at least one side concave.

The common form in our range may be referred to as *P. lapathifolium* var. *nodosum* (Raf.) Weinm. A variant type, *P. lapathifolium* var. *prostratum* Wimmer, has been collected in Cuyahoga, Lorain, Monroe, and Portage counties. Some of its habitats are railroad yards, gravel heaps, and pavement cracks. The plants are semi-prostrate and the leaves are not lanceolate but more sub-rhombic, and often have dark purple blotches in the center.

*9. *Polgonum hydropiper* L. Waterpepper. Marshpepper smartweed. Common smartweed. The first two common names derive from the sharp taste of chewed fresh leaves. The third name is something of a misnomer as several other species are more common, at least in Ohio.

This and the next two species have their sepals beset with numerous dots which look like resin glands.

Leaves of P. *hydropiper* tend to be wavy at the edges, and the plants often have a reddish appearance. The leaves bear cleistogamous flowers in their ocreae, as delineated in the key. The habitat is damp to wet soils.

10. *Polgonum punctatum* Elliott. Dotted smartweed. Both Latin and common names refer to the resin glands on the sepals. This species was long known as *Polygonum acre* HBK, and is still so listed in many publications. The species is often confused with *P. hydropiper*, but does not have the wavy leaves, reddish coloration, or cleistogamous flowers of *P. hydropiper*. The flowers of *P. punctatum* are greenish-white.

Dotted smartweed usually occurs in wet places or shallow water, tolerating some shade. Mitchell and Dean (1978) state that it is the most common native smartweed in New York state. Some authors segregate the population into varieties. This is not done here.

11. *Polygonum robustius* (Small) Fernald. Robust smartweed. This stout perennial is regarded by some as a variant of *P. punctatum*, and occurs in the same type of habitat. It is found on the Atlantic coastal plain from Massachusetts to Florida, and into tropical America, but only rarely inland. Only three specimens have been collected in Ohio: one in Auglaize County in 1898, one in Portage County in 1920, and one in Carroll County in 1983. Thus its occurrence in this state is very rare and sporadic.

12. *Polygonum amphibium* L. Water smartweed. This complex and variable species gets the name *amphibium* from the fact that some forms are aquatic and some terrestrial. Ohio's representatives of the varieties and their intermediates are delineated and their county distribution shown by Hobbs (1989).

13. *Polygonum hydropiperoides* Michx. Mild smartweed. Mild waterpepper. The specific epithet means "resembling *P. hydropiper*." This smartweed is a perennial which inhabits wet places or shallow water usually in full sunlight.

The sepals and other inflorescence parts sometimes bear flat, sparse, whitish dots or excrescences which are easily dislodged. These should not be confused with the resin glands of *P. hydropiper* and *P. punctatum* which are imbedded in the tissue and cannot be dislodged.

P. hydropiperoides resembles *P. persicaria* in several respects and is often confused with it on herbarium specimens. The former is a perennial of wetter places, has more slender and elongate inflorescences. Its ocreae are strigose on the sides and bear long firm bristles at the summit; whereas the latter is an annual of damp places, with shorter and dense inflorescences, membranous ocreae with only a few hairs on the sides, and bear short weak cilia at the summit.

A distinguishing feature of *P. hydropiperoides* flowers is that at least some of them are open wide in the field and on dried specimens (spreading sepals), while the flowers of other smartweeds remain more or less closed.

A number of varieties have been named based on pubescence differences, leaf shape, and inflorescence disposition. Mitchell and Dean (1978) observe that the group plus several closely related species not found in Ohio form a widespread, polymorphic complex in need of further study. For this reason we here are regarding all specimens referred to *P. hydropiperoides* in *sensu lato*.

*14. *Polygonum cespitosum* Blume. Long-bristled smartweed. Bristly ladys-thumb. Tufted knotweed. All Ohio plants are of the variety *longisetum* (DeBruyn) Steward.

The bristles at summit of ocreae are long (5-10 mm or more) and prominent—longer than in any other of the smartweed species. While many of the plants have lanceolate leaves like other smartweeds, there is a common occurrence of shorter, sub-rhombic leaves. The inflorescence is rosy-red.

This species is a relatively new member of the flora, and comes from tropical and subtropical eastern Asia. It was first discovered in the United States in 1910 near Philadelphia (Kochman 1991). Kochman also traces the spread of this smartweed through eastern United States. It is advancing more slowly in the northern states than in the southern. Mitchell and Dean (1978) show a fair distribution in New York State, but Voss (1985) records it from only one county in Michigan. The earliest herbarium specimen collected in Ohio was in 1951. It occurs in moist but not wet situations, and can become very weedy.

15. *Polygonum careyi* Olney. Carey's smartweed. This pubescent smartweed was last collected in 1920, and many believe it is now extirpated from the state. Of all the herbarium specimens examined for the present study, only three are of *P. careyi*, and they were collected by the same person, E. L. Moseley, in Erie County—two in the 19th century and one in the 20th. This species is found more commonly in areas north and east of Ohio. It is cited by the Ohio Division of Natural Areas and Preserves as "extirpated" (1990).

*16. *Polygonum orientale* L. Princes feather. Kiss-me-over-the-garden-gate. In the past this tall annual was frequently cultivated and sometimes escaped cultivation. It has been collected from scattered counties in Ohio. An interesting morphological character is the flanged summit of the ocrea, resembling that of *P. amphibium* L. var. *stipulaceum* Coleman in this regard.

Section *Echinocaulon* (Tearthumbs)

These plants are called tearthumbs because their stems are beset with rows of minute downward-pointing prickles which catch on the fingers and on clothing. The plants are decumbent and often inhabit wet ditches and similar places. Two species occur in Ohio. Another species, *Polygonum perfoliatum* L., adventive from Asia, has become established in Pennsylvania and West Virginia (Fernald 1950).

17. *Polygonum sagittatum* L. Arrow-leaved tearthumb. The leaves have a strongly sagittate base. It is widely distributed in Ohio—probably in every county.

18. *Polygonum arifolium* L. Halberd-leaved tearthumb. The leaves are more ovate with a strongly hastate base. This species is not so common as the preceding nor has it been collected from as many counties. This is also true in Indiana (Deam 1940), Michigan (Voss 1985), Pennsylvania (Wherry et al. 1979), New York (Mitchell and Dean 1978), and the Carolinas (Radford et al. 1968). One may speculate as to why one species appears to be more successful than the other, since they share most of the same morphology and the same habitat.

Section *Tiniaria* (Climbing Polygonums)

The plants in this section are twining vines. The leaves are mostly ovate with cordate bases. There are three species in the Ohio flora.

19. *Polygonum cilinode* Michx. Blackfringe knotweed. Mountain bindweed. This species gets its name from the ring of bristly hairs at the nodes. The inflorescence differs from the other two climbing polygonums in being an open panicle. As noted on the map, the plants have been collected mainly from the northeastern counties of Lake,

Ashtabula, Summit, and Portage. The species is of widespread occurrence in states to the north of Ohio and in the Appalachian Mountains. A specimen collected in Hamilton County probably about 1900 is doubtful, but is shown on the map. This species is listed as "Endangered" by the Ohio Division of Natural Areas and Preserves (1990).

*20. *Polygonum convolvulus* L. Wild buckwheat. Black bindweed. This alien from Europe is widely naturalized, although it seems to be less abundant than the native *P. scandens*. The two species are often confused. The sepals and rachis of *P. convolvulus* are usually covered with many minute granules, thus appearing dull, and the achene is likewise roughened and dull. The granules referred to above are whitish, and their large number give the inflorescence the appearance of being frosted when magnified. The sepals and rachis of the other climbing polygonums are quite glabrous and smooth, as is the achene. The flowers of *P. convolvulus* appear to be scarcely open, even at anthesis.

21. *Polygonum scandens* L. Climbing false buckwheat. Hedge smartweed. This ubiquitous native climber usually has at least some of the fruits with wings which are projections of the adhering sepals. The flowers are wide open at anthesis with widely spreading white sepals. This is reminiscent of the situation in *P. hydropiperoides*, referred to previously.

Attempts have been made by various authors to divide *P. scandens* into several species or varieties. Two of these are *P. dumetorum* L. and *P. cristatum* Engelmann and Gray. Here we are treating *P. scandens* in *sensu lato*; this conclusion follows intensive study of such variable characters as size and prevalence of wings on the fruits, size of the fruits, and shape of the leaves and their reduction upward. These characters intergrade, and thus no definite separation is justified. Horton (1972) also tried to separate *P. cristatum* from *P. scandens* on the basis of achene length and calyx length, and concluded that the separation was not feasible. Deam (1940) opined "most of our reports in Indiana of *P. dumetorum* should be referred to *P. scandens*. I doubt if the two species are distinct." Voss (1985) treats *P. scandens* as one complex species. Mitchell and Dean (1978) consider that the group represented by *P. scandens*, *P. dumetorum*, and *P. cristatum* is in need of careful statistical study. Furlow (1991) includes the latter two taxa in *P. scandens*.

Section *Pleuropterus*

The plants in this section are tall, stout herbaceous perennials with broad leaves and large inflorescences. The outer calyx lobes are conspicuously winged at maturity. The plants tend to occur in colonies, reproducing and spreading vegetatively. There are two species in the Ohio flora, both naturalized from eastern Asia.

*22. *Polygonum cuspidatum* Sieb. and Zucc. Japanese knotweed. Mexican bamboo. This species is rather widely scattered in the state, having been introduced as an ornamental. It is now considered a persistent weed difficult to eradicate because of the virile perennial underground parts. The clumps are a striking sight along roadsides in September when in bloom; the large white colonies are visible at considerable distance.

*23. *Polygonum sachalinense* F. Schmidt. Sachaline. Giant knotweed. Sakhaline knotweed. This plant is of more limited distribution than the preceding species. It has been collected from only seven counties, mostly bordering the Ohio River. It is also more recently adventive. It is not listed in Gray's 7th edition (Robinson and Fernald 1908), Schaffner (1928), or *Ohio Biological Survey Revised Catalog* (Schaffner 1932). The earliest herbarium specimen encountered was dated 1932.

Section *Tovara*

This section is represented in our flora by a single species, and has been separated from the rest of the genus *Polygonum* more frequently than has any other species or section. It is included here in *Polygonum sensu lato* following Gleason (1952), Voss (1985), Mitchell and Dean (1978), and Deam (1940).

24. *Polygonum virginianum* L. Jumpseed. Virginia knotweed. This plant is common in woodlands throughout Ohio and beyond. In general aspect it resembles the smartweeds, section *Persicaria*. The styles, however, are persistent in fruit and become reflexed, indurate, and hooked at the tip. The mature fruits shoot away to considerable distance, and this gives rise to the common name "jumpseed." The plant is tolerant of considerable shade, and is generally regarded as a wildflower rather than a weed in common parlance.

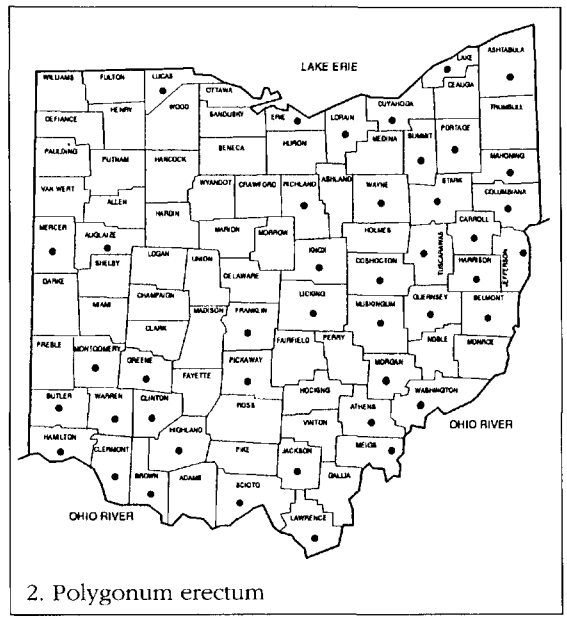
The young shoots of this perennial "knotweed" often have dark purple splotches in the leaves reminiscent of young leaves of *P. pensylvanicum* and some other smartweeds. This author maintains that the presence of these marks (discussed below) constitutes a physiological or biochemical affinity with the smartweeds and is a compelling reason for inclusion of this section in the genus *Polygonum*. Many authors, however, have used the persistent, indurate styles as a reason for removal of this section from *Polygonum* and placing these plants in the genus *Tovara* (Fernald 1950, Weishaupt 1971, Radford et al. 1964, Wherry et al. 1979, Schaffner 1928).

General Remarks

Smut. A few herbarium specimens showed smut-infested flowers and fruits. Most of these instances occurred in the twining polygonums. The fungus so altered the morphological characters that it was often difficult or impossible to determine the species.

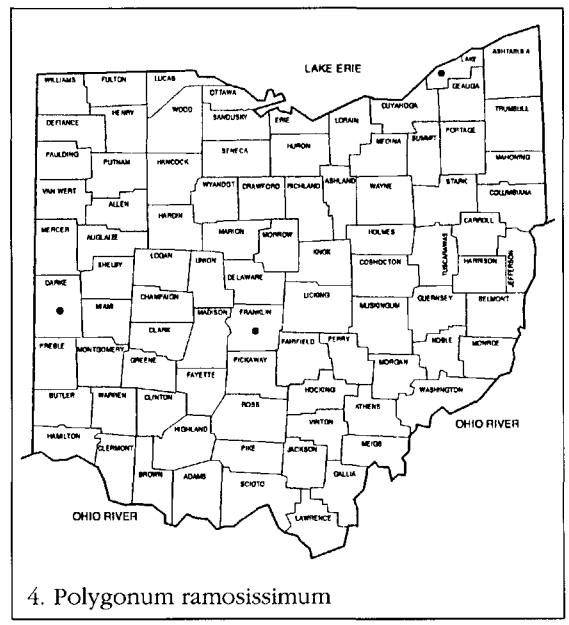
Leaf Markings. Purplish marks in the center of leaves have been alluded to previously. The shape and persistence of the marks vary with the species. The marks or splotches are very common in ladys-thumb (*P. persicaria*), are mainly found in young leaves of *P. pensylvanicum* and *P. virginianum*, are common in *P. lapathifolium* var. *prostratum* but rare in the more typical variety *nodosum*. They are rare in *P. hydropiperoides*, and also occur in some Asian species not part of the Ohio flora. Kochman (1991) states that they occur in *P. cespitosum*, but we have seen only slight evidence of them in this species, either in the field or on herbarium specimens. The marks apparently do not occur in the sections *Avicularia*, *Echinocaulon*, *Tiniaria*, and *Pleuropterus*.

*1. Polygonum aviculare



2. Polygonum erectum

3. Polygonum achoreum



4. Polygonum ramosissimum

5. Polygonum tenue

*6. Polygonum persicaria

FIGURE 1. Distribution of each *Polygonum* species by county in Ohio. The number and name below each map correspond with those on the species list. Counties in which the species occurs are marked with a dot. * = Naturalized or adventive species.

7. Polygonum pensylvanicum

8. Polygonum lapathifolium

*9. Polygonum hydropiper

10. Polygonum punctatum

11. Polygonum robustius

12. Polygonum amphibium

FIGURE 1. (Continued)

13. Polygonum hydropiperoides

*14. Polygonum cespitosum

15. Polygonum careyi

*16. Polygonum orientale

17. Polygonum sagittatum

18. Polygonum arifolium

FIGURE 1. (Continued)

19. Polygonum cilinode

*20. Polygonum convolvulus

21. Polygonum scandens

*22. Polygonum cuspidatum

*23. Polygonum sachalinense

24. Polygonum virginianum

FIGURE 1. (Continued)

Misidentification. In the present study of the thousands of herbarium specimens of *Polygonum*, many instances of misidentification were encountered. Usually the errors were in species, but sometimes they were generic. The most common confusions were among the smartweeds. Following are the mix-ups most frequently encountered:

P. persicaria and *P. pensylvanicum*
P. persicaria and *P. hydropiperoides*
P. hydropiper and *P. punctatum*
P. pensylvanicum and *P. lapathifolium*
P. hydropiper and *P. hydropiperoides*
P. hydropiperoides and *P. punctatum*
P. scandens and *P. convolvulus*

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LITERATURE CITED

Bailey Hortorium Staff 1976 Hortus Third. Macmillan Publishing Company, New York, NY. 1290 pp.

Deam, C. C. 1940 Flora of Indiana. Department of Conservation, Division of Forestry, Indianapolis, IN. 1236 pp.

Fernald, M. L. 1950 Gray's Manual of Botany. 8th Ed. American Book Company, New York, NY. 1632 pp.

Furlow, J. J. 1991 The vascular flora of Ohio. Vol. 2, Part 1. Dicotyledoneae: Saururaceae through Fabaceae. Checklist and distribution maps. Processed. 106 pp.

Gleason, H. A. 1952 The New Britton and Brown Illustrated Flora of the northeastern United States and adjacent Canada. Vol 2. New York Botanical Garden, New York. 655 pp.

_____ and A. Cronquist 1991 Manual of vascular plants of northeastern United States and adjacent Canada. 2nd Ed. New York Botanical Garden, Bronx, NY. 910 pp.

Graham, S. A. and C. E. Wood 1965 The Genera of Polygonaceae in the southeastern United States. Jour. of the Arnold Arb. 46: 91-121.

Hobbs, C. H. 1989 Distribution of *Polgonum amphibium* L. (Polygonaceae) in Ohio. Ohio J. Sci. 89: 65-66.

Horton, J. H. 1972 Studies on southeastern United States flora. IV. Polygonaceae. J. of the Elisha Mitchell Scientific Soc. 88: 92-102.

Kochman, A. 1991 *Polygonum cespitosum* var. *longisetum*. Bristly Ladys-thumb. Ohio J. Sci. 91: 28.

Mitchell, R. S. and J. K. Dean 1978 Polygonaceae (Buckwheat Family) of New York State. New York State Museum Bulletin No. 431, Albany, NY. 81 pp.

Myers, J. C. 1942 A new variety of *Polgonum pensylvanicum*. Castanea 7: 74-75.

Ohio Division of Natural Areas and Preserves 1990 Rare native Ohio Plants: 1990-1991 status list. Ohio Dept. of Natural Resources, Columbus, OH. 24 pp.

Radford, A. E., A. E. Ahles, and C. R. Bell 1968 Manual of the vascular flora of the Carolinas. University of North Carolina Press, Chapel Hill, NC. 1183 pp.

Robinson, B. L. and M. L. Fernald 1908 Gray's New Manual of Botany. 7th Ed. American Book Company, New York, NY. 926 pp.

Schaffner, J. H. 1928 Field Manual of the flora of Ohio. R. G. Adams and Company, Columbus, OH. 638 pp.

_____ 1932 Revised catalog of Ohio vascular plants. Ohio Biological Survey Bulletin No. 25. Ohio State University, Columbus, OH. 215 pp.

Styles, B. T. 1962 The taxonomy of *Polygonum aviculare* and its allies in Brittain. Watsonia 5: 177-214.

Voss, E. G. 1985 Michigan Flora. Part II. Cranbrook Institute of Science and University of Michigan Herbarium, Ann Arbor, MI. 724 pp.

Weed Science Society of America 1989 Composite List of Weeds. Weed Sci. Soc. of Amer., Champaign, IL. 112 pp.

Weishaupt, C. G. 1971 Vascular plants of Ohio. 3rd Ed. Kendall/Hunt Publishing Company, Dubuque, IA. 292 pp.

Wherry, E. T., J. M. Fogg, and H. A. Wahl 1979 Atlas of the flora of Pennsylvania. Morris Arboretum of the University of Pennsylvania, Philadelphia, PA. 390 pp.